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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,668	12/27/2005	Yoav Bar-Yaakov	0-05-109	4122
42009 7590 02/04/2010 KEVIN D. MCCARTHY ROACH BROWN MCCARTHY & GRUBER, P.C. 424 MAIN STREET 1920 LIBERTY BUILDING BUFFALO, NY 14202				
EXAMINER				
MCCULLEY, MEGAN CASSANDRA				
ART UNIT		PAPER NUMBER		
1796				
MAIL DATE		DELIVERY MODE		
02/04/2010		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/541,668

**Applicant(s)**

BAR-YAAKOV ET AL.

**Examiner**

Megan McCulley

**Art Unit**

1796

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 December 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4, 6-10 and 20-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-10 and 20-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

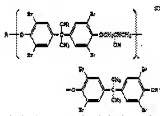
## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 22, 1-3 and 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakai et al. (U.S. Pat. 5,250,590) in view of Nantaku et al. (JP 2001-310990). Citations to the Japanese document refer to the English translation of the document.

Regarding claim 22: Nakai et al. teaches a flame retardant polymeric composition (abstract) comprising compounds of the formula:



where R and R' can be a glycidyl group or . It is

made by bromobisphenol A epoxy/low molecular weight brominated epoxide and tribromophenol at a temperature of 200 °C (col. 6 lines 25-30) which would make resins with the bromine in the positions claimed in the formulas of claim 1. While the specific type of bromobisphenol A epoxy is not disclosed, it is inherent that tetrabromobisphenol A is used since there are four bromines on the bisphenol moiety as shown in the picture of the abstract. No solvent is used in the production (col. 6 lines 25-32). A catalyst/lithium hydroxide is used (col. 6 lines 25-30). The degree of polymerization is n=30 and the epoxy equivalent is 90,000 (Table 1 example 3). From these numbers,

the molecular weight and percentage of glycidyl end groups can be calculated. The molecular weight is in the range of 18672-19334:  $526 \text{ (end group)} + 600 \text{ (middle group)} * 30 = 18526$  + either  $73 * 2$  for 2 epoxy end groups or  $+ 404 * 2$  for 2 tribromophenyl groups. Therefore, the amount of epoxy end groups is in the range of 10.3-10.7%:  $18672 \text{ g composition/mol composition} * 1 \text{ epoxy equivalent/90000 g composition} * 1 \text{ mol composition/2 mol end groups} * 100\% = 10.3\% \text{ epoxy/mol end groups}$ ;  $19334 \text{ g composition/mol composition} * 1 \text{ epoxy equivalent/90000 g composition} * 1 \text{ mol composition/2 mol end groups} * 100\% = 10.7\% \text{ epoxy/mol end groups}$ . The tribromophenyl ends group would then be 89.7-89.3%. The reduction in corrosion is a latent property of the composition. See MPEP 2145 II.

Not disclosed is the acid number or the amount of free tribromophenol content. However, Nantaku et al. teaches a similar composition with an acid number of 0.3 mgKOH/g (para. 31). This would correspond to an amount of free tribromophenol of 0.03% if this number is only reflective of the residual tribromophenol. Nantaku et al. and Nakai et al. are analogous art since they are both concerned with the same field of endeavor, namely compositions of brominated epoxy flame retardants. At the time of the invention a person having ordinary skill in the art would have found it obvious to combine the acid number of Nantaku et al. with the flame retardant of Nakai et al. and would have been motivated to do so for such desirable properties as less generation of corrosive gas, as evidenced by Nantaku et al. (para. 19).

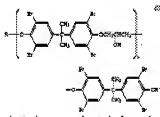
While no solvent is mentioned in Nakai et al., if there were any residual solvent in the composition not disclosed in the patent, it would be obvious to remove it as in

example 2 of Nantaku et al. At the time of the invention a person having ordinary skill in the art would have found it obvious to remove any undisclosed solvent of Nakai et al. as in example 2 of Nantaku et al. and would have been motivated to do so to achieve a solid product, as evidenced by Nakai et al. (example 2).

The molecular weight of the low molecular weight brominated epoxide is not disclosed. However, Nantaku et al. teaches using a low molecular weight epoxy having a molecular weight of 790 g/mol (example 2 para. 31). At the time of the invention a person having ordinary skill in the art would have found it obvious to use the low molecular weight epoxy of Nantaku et al. in the process of Nakai et al. and would have been motivated to do so since viscosity is dependent on molecular weight and a low viscosity reactant is easier to mix in the reaction.

The limitation that the flame retardants are used for polymeric compositions comprising a polymer selected from the group consisting of polyethylene terephthalate, polybutylene terephthalate, etc. is an intended use statement and carries little patentable weight.

Regarding claims 1, 2, 3, 6, 7, 8, 9: Nakai et al. teaches a flame retardant polymeric composition (abstract) comprising compounds of the formula:



where R and R' can be a glycidyl group or



. It is

made by bromobisphenol A epoxy and tribromophenol (col. 6 lines 25-30) which would make resins with the bromine in the positions claimed in the formulas of claim 1. While

the specific type of bromobisphenol A epoxy is not disclosed, it is inherent that tetrabromobisphenol A is used since there are four bromines on the bisphenol moiety. No solvent is used in the production (col. 6 lines 25-32). The degree of polymerization is  $n=30$  and the epoxy equivalent is 90,000 (Table 1 example 3). From these numbers, the molecular weight and percentage of glycidyl end groups can be calculated. The molecular weight is in the range of 18672-19334:  $526$  (end group) +  $600$  (middle group)  $\times 30 = 18526$  + either  $73 \times 2$  for 2 epoxy end groups or  $+ 404 \times 2$  for 2 tribromophenyl groups. Therefore, the amount of epoxy end groups is in the range of 10.3-10.7%:  $18672 \text{ g composition/mol composition} \times 1 \text{ epoxy equivalent/90000 g composition} \times 1 \text{ mol composition/2 mol end groups} \times 100\% = 10.3\% \text{ epoxy/mol end groups}$ ;  $19334 \text{ g composition/mol composition} \times 1 \text{ epoxy equivalent/90000 g composition} \times 1 \text{ mol composition/2 mol end groups} \times 100\% = 10.7\% \text{ epoxy/mol end groups}$ . The tribromophenyl ends group would then be 89.7-89.3%. The reduction in corrosion is a latent property of the composition. See MPEP 2145 II.

Not disclosed is the acid number or the amount of free tribromophenol content. However, Nantaku et al. teaches a similar composition with an acid number of 0.3 mgKOH/g (para. 31). This would correspond to an amount of free tribromophenol of 0.03% if this number is only reflective of the residual tribromophenol. Nantaku et al. and Nakai et al. are analogous art since they are both concerned with the same field of endeavor, namely compositions of brominated epoxy flame retardants. At the time of the invention a person having ordinary skill in the art would have found it obvious to combine the acid number of Nantaku et al. with the flame retardant of Nakai et al. and

would have been motivated to do so for such desirable properties as less generation of corrosive gas, as evidenced by Nantaku et al. (para. 19).

While no solvent is mentioned in Nakai et al., if there were any residual solvent in the composition not disclosed in the patent, it would be obvious to remove it as in example 2 of Nantaku et al. At the time of the invention a person having ordinary skill in the art would have found it obvious to remove any undisclosed solvent of Nakai et al. as in example 2 of Nantaku et al. and would have been motivated to do so to achieve a solid product, as evidenced by Nakai et al. (example 2).

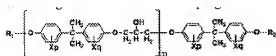
***Claim Rejections - 35 USC § 102***

***Claim Rejections - 35 USC § 103***

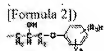
The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 3, 4, 6-10, and 21 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Nantaku et al. (JP 2001-310990). Citations to the Japanese document refer to the English translation of the document.

Regarding claims 1, 3, 6, 7, 8, 9: Nantaku et al. teaches a flame retardant polymeric composition (abstract) comprising compounds of the formula:



where R1 and R2 can be a glycidyl group or



and X and Y can be a halogen (para. 7 page 3). It is made by

brominated bisphenol A epoxy, tetrabromobisphenol A and tribromophenol (para. 31 page 7) which would make resins with the bromine in the positions claimed in the formulas of claim 1. Synthetic example 2 (page 7 para. 31) removes the solvent as in example 1 (para. 30). The acid number is 0.3 mgKOH/g (para. 31). If this is only reflective of the residual tribromophenol, the amount of free tribromophenol would be 0.03%. The degree of polymerization is  $n=22$  and the epoxy equivalent is 40,300 (para. 31). From these numbers, the molecular weight and percentage of glycidyl end groups can be calculated. The molecular weight is in the range of 13872-14534: 526 (end group) + 600 (middle group) \* 22 = 13726 + either 73\*2 for 2 epoxy end groups or + 404\*2 for 2 tribromophenyl groups. Therefore, the amount of epoxy end groups is in the range of 17.2%-18%: 13872 g composition/mol composition \* 1 epoxy equivalent/40300 g composition \* 1 mol composition/2 mol end groups \* 100% = 17.2% epoxy/mol end groups; 14534 g composition/mol composition \* 1 epoxy equivalent/40300 g composition \* 1 mol composition/2 mol end groups \* 100% = 18% epoxy/mol end groups. The tribromophenyl ends group would then be 82%-82.8%. The reduction in corrosion is a latent property of the composition. See MPEP 2145 II.

While the method of making the flame retardant is not the method claimed in instant claim 22, this is a product by process claim. Product-by-process claims are not

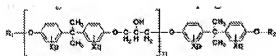


limited to the manipulations of the recited steps, only the structure implied by the steps (see MPEP 2113). It is the position of the Office that the structure of the flame retardant made by the process of claim 22 is the flame retardant recited in Nantaku et al.

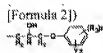
Alternatively, the flame retardant of Nantaku et al. is so close in structure and function to the flame retardant made by claim 22 that a person having ordinary skill in the art would expect them to have the same properties.

Regarding claim 4: Since the composition of flame retardant resins has 17-18% epoxy end groups (see rejection above) and if all of these end groups were found on a compound of formula (I), which has two epoxy groups, the amount of this compound in the composition would be 8.5-9%, which is within the claimed range of 0-10%. If all of these epoxy groups were found on a compound of formula (III), which has one epoxy group, the amount of this compound in the composition would be 17-18%, which is within the claimed range of 0-30%. Therefore, all the ranges are inherently met because if the epoxy groups were found on a mixture of these two compounds, the amounts of the compounds would only decrease and remain within the claimed range.

Regarding claim 10: Nantaku et al. teaches a polyamide or a polycarbonate (para. 27) comprising compounds of the formula:



where R1 and R2 can be a glycidyl group or



and X and Y can be a halogen (para. 7 page 3). It is made by

brominated bisphenol A epoxy, tetrabromobisphenol A and tribromophenol (para. 31

page 7) which would make resins with the bromine in the positions claimed in the formulas of claim 1. Synthetic example 2 (page 7 para. 31) removes the solvent as in example 1 (para. 30). The acid number is 0.3 mgKOH/g (para. 31). If this is only reflective of the residual tribromophenol, the amount of free tribromophenol would be 0.03%. The degree of polymerization is  $n=22$  and the epoxy equivalent is 40,300 (para. 31). From these numbers, the molecular weight and percentage of glycidyl end groups can be calculated. The molecular weight is in the range of 13872-14534:  $526 \text{ (end group)} + 600 \text{ (middle group)} * 22 = 13726 + \text{either } 73*2 \text{ for 2 epoxy end groups or } + 404*2 \text{ for 2 tribromophenyl groups}$ . Therefore, the amount of epoxy end groups is in the range of 17.2%-18%:  $13872 \text{ g composition/mol composition} * 1 \text{ epoxy equivalent/40300 g composition} * 1 \text{ mol composition/2 mol end groups} * 100\% = 17.2\% \text{ epoxy/mol end groups}$ ;  $14534 \text{ g composition/mol composition} * 1 \text{ epoxy equivalent/40300 g composition} * 1 \text{ mol composition/2 mol end groups} * 100\% = 18\% \text{ epoxy/mol end groups}$ . The tribromophenyl ends group would then be 82%-82.8%. The reduction in corrosion is a latent property of the composition. See MPEP 2145 II.

Regarding claim 21: Nantaku et al. further teaches filler (para. 26).

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nantaku et al. (JP 2001-310990) as applied to claim 10 above and in view of Chisholm et al. (US 2001/0009944). Citations to the Japanese document refer to the English translation of the document.

Regarding claim 20: Nantaku et al. set forth the basic claimed composition as set forth above. Not disclosed is a hindered phenol antioxidant. However, Chisholm et al. teaches a polyethylene terephthalate or polybutylene terephthalate (para. 31) based resin comprising brominated polyepoxide flame retardants (para. 47) with a hindered phenol antioxidant (Table 1). Nantaku et al. and Chisholm et al. are analogous art because they are both concerned with the same field of endeavor, namely brominated epoxy flame retardants in PET or PBT resin compositions. At the time of the invention a person having ordinary skill in the art would have found it obvious to combine the hindered phenol antioxidant of Chisholm et al. with the composition of Nantaku et al. and would have been motivated to do so for such desirable properties as radical chain transfer inhibition.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-4, 6-10, 20-22 have been considered but are moot in view of the new ground(s) of rejection.

### ***Correspondence***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Megan McCulley whose telephone number is (571)270-3292. The examiner can normally be reached on Monday - Thursday 7:30-6:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached on (571) 272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Eashoo/  
Supervisory Patent Examiner, Art Unit 1796

/M. M./  
Examiner, Art Unit 1796